New Zealand BioSecure

BORDER HEALTH NEWSLETTER

MARCH 2023

NAU MAI, HAERE MAI - WELCOME!

Kia ora koutou katoa,

Autumn is here and temperatures are starting to drop, meaning the mozzie season is almost done for the year and surveillance programmes will soon be starting to switch over to fortnightly checks. Take an opportunity to sit down with your favourite autumn drink and learn about one of our endemic mosquito species, *Culiseta tonnoiri*, who enjoys the rainy and humid valleys of New Zealand. Challenge yourself with a new mosquito-world related crossword and to learn what makes a good mozzie photo for preliminary ID - this month we congratulate Kevin Zhang for taking the best mosquito photo of the month! Finally, have some fun by checking our bite-of-humour section.

In the news this month, read about the explosive increase in mosquito numbers in the Hawke's Bay following Cyclone Gabrielle and internationally; learn about the new treatments WHO recommends be applied to bed nets in replacement of pyrethroids, read about the detection of two dangerous mosquito-borne viruses in the Pilbara region of Western Australia, and about the tropical mosquito, *Culex lactator* and its recent invasion to Florida. Also, learn about research carried out in California, where scientists are analysing the proteins in *Culex pipiens* sperm in an effort to use this to modify the sperm and prevent it from fertilising the egg. Finally, learn how Nigerians are getting ready to vaccinate their population against malaria.

Happy reading!

SURVEILLANCE

During March 1,415 routine, enhanced surveillance and 400m survey samples were collected by staff from 12 PHUs (Figure 1). The samples included 349 positive larval samples and 190 positive adult samples, leading to a total of 7,829 adults and 15,286 larvae identified over the past month (Table 1). *Culex quinquefasciatus* are the dominant larval species this month,

which is the same as last month and this month last year (Table 1).

In total, nine mosquito species have been collected this month (Table 1), two more than collected last month.

Compared to this same month last year, the total number of larvae have shown a decrease (15%) while the adults have shown an increase (152%) (Table 1).

Compared to the previous month, mosquito larval numbers have shown a decrease (15%) while adult numbers have shown an increase (137%).

Table 1. Adult and larvae sampled by the New Zealand surveillance program during March 2022 & 2023

Species (common name)	Adults		Larvae	
	Mar 23	Mar 22	Mar 23	Mar 22
Aedes antipodeus (winter mosquito)	619	31	-	-
Ae australis (saltwater mosquito)	4	-	19	10
Ae notoscriptus (striped mosquito)	931	598	3,689	2,933
Coquillettidia iracunda (no common name)	29	31	-	-
Coquillettidia tenuipalpis (no common name)	-	2	-	-
Culex asteliae (no common name)	2	12	20	-
Cx pervigilans (vigilant mosquito)	1,070	496	1,856	1,748
Cx quinquefasciatus (southern house mosquito)	5,013	1,843	9,679	13,216
Culex sp.	128	97	-	-
Culiseta tonnoiri (no common name)	33	-	-	-
Opifex fuscus (rock pool mosquito)	-	-	23	155
Total	**7,829**	**3,110**	**15,286**	**18,062**

The highest number of larvae sampled this month was obtained in Canterbury (6,584 larvae) followed by Northland (2,377 larvae) (Figure 1).

Aedes notoscriptus larval numbers have shown an increase in seven PHUs and a decrease in four PHUs from this same month last year (Figure 2).

As expected, *Aedes notoscriptus* has not been recorded this month, this year, or last year in Public Health South (Figure 2).

Culex quinquefasciatus larval numbers have shown an increase in seven PHUs and a decrease in four from this same month last year.

Culex quinquefasciatus has been detected again this month in Public Health South at Queenstown Airport and Dunedin Port (Figure 2).

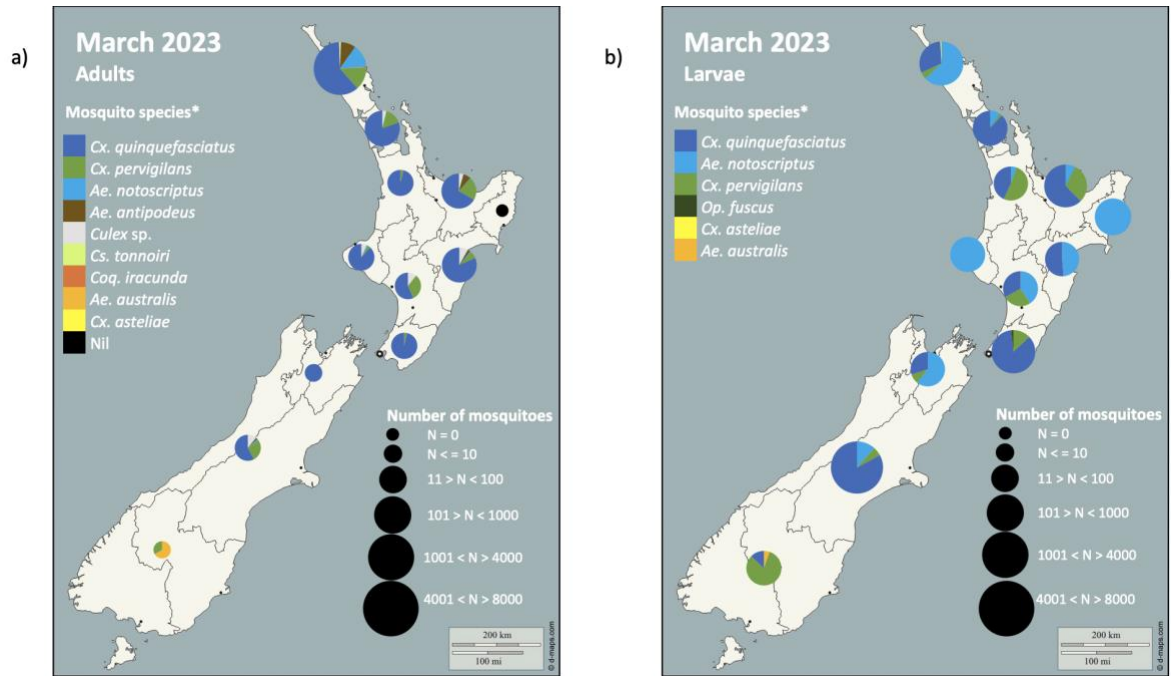

Figure 1. Total mosquito adults (a) and larvae (b) sampled in New Zealand during the March 2023 surveillance period. Please note that the markers represent the PHUs and not the specific sites where the samples have been taken.
* The mosquito species are listed in order from the most abundant to the least abundant.

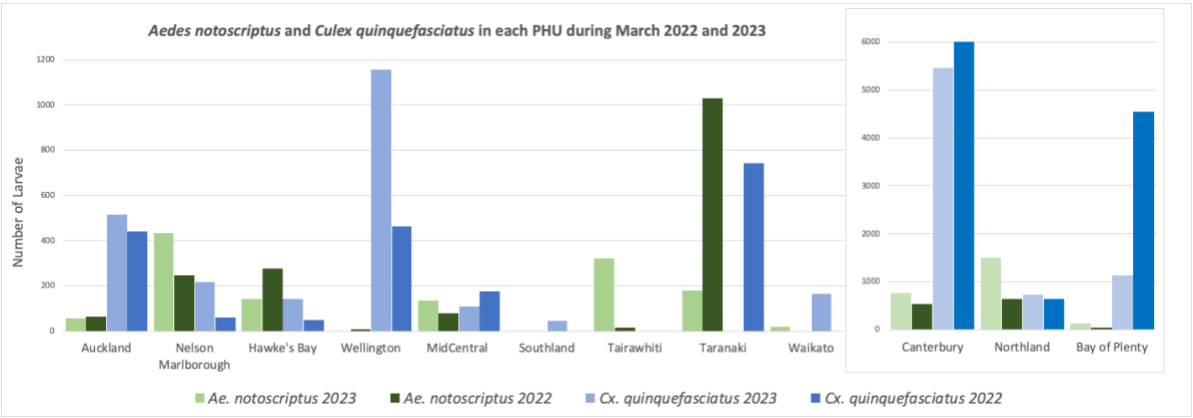

Figure 2. Comparison between introduced mosquito species sampled in each PHU during March 2022 and 2023.
*Please note the different scale for the number of larvae present in Canterbury, Northland and Bay of Plenty in comparison to the other PHUs.

INCURSIONS AND INTERCEPTIONS

During March, HPOs responded to two suspected interceptions (Table 2). Locally occurring species of exotic origin are highlighted in light blue.

Table 2. Suspected interception during March 2023

Date	Species	Location	Circumstances
07.03.2023	No sample	Wiseway Logistics, Māngere, Auckland	Multiple suspected mosquitoes were observed flying inside a general cargo container originated from the UK.
13.03.2023	1 Female *Culex quinquefasciatus*	Auckland International Airport	Found alive by MPI officer, while inspecting a passenger luggage. The flight originated in the Solomon Islands and had a stop in Brisbane, Australia.

NEWS ARTICLES FROM AROUND THE WORLD

WHO publishes recommendations on two new types of insecticide-treated nets

Since 2005 over 2 billion bet nets that have been treated with pyrethroids have been distributed in an effort to combat malaria. Unfortunately, many of the mosquitoes in these areas are now resistant to pyrethroids, so nets treated with different active ingredients will be needed to control malaria. New recommendations from the World Health Organization cover two new classes of dual ingredient insecticide treated nets. Read more about these here.

Two mosquito-borne viruses detected in the Pilbara region of Western Australia

Residents and people travelling to the Pilbara region of Western Australia are being encouraged to protect themselves against mosquito bites following the detection of Murray Valley encephalitis (MVE) virus in sentinel chicken flocks in the region, as well as the detection of Japanese encephalitis virus. Both viruses are transmitted through the bite of an infected mosquito and cases can range from mild to severe. Read the full media release from the Government of Western Australia's Department of Health for Murray Valley encephalitis here, and read the full release for Japanese encephalitis virus here.

"Mosquitoes must go": a Nigerian community tackles malaria

The residents of a small community in Lagos, Nigeria are declaring war on mosquitoes as they wait for the malaria vaccination pilot programme branded Mosquirix to become

available for them. The community is ensuring that mosquito management measures are used to help prevent mosquitoes breeding through measures such minimising standing water and biting though the use of bed nets and protective clothing. Read more about the vaccine and how the community is protecting themselves from mosquitoes here.

Biting mosquitoes on the rise in Hawke's Bay - here's five tips on how to avoid them

Following Cyclone Gabrielle, an increase in the amount of standing water around the Hawkes Bay region has led to an increase of mosquito activity. The increase of standing water in the region has increased the habitats available for mosquito species that will bread in groundwater, such as the two local *Culex* species. You can read more here, including finding out some steps you can take to reduce the mosquito population around your home.

Uh-oh. A new tropical mosquito has come to Florida. The buzz it's creating isn't good

Florida is home to around 90 species of mosquito, with this number slowly increasing as new species become established. Of the 17 non-native species, 6 have been detected in the past 5 years, with the latest being a species *Culex lactator*. This was first found in 2018 and has now spread through Southwest Florida. While not much is known about this new addition to the mosquito fauna of Florida, other members of the group it is part of are known to carry West Nile and St. Louis encephalitis viruses, and there is concern over this species potential to be a vector. Read more about it here.

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Humans bite back by deactivating mosquito sperm

Researchers from the University of California, Riverside have been looking at the proteins found in *Culex pipiens* mosquito sperm to find the proteins that allow them to swim, in an effort to use this to modify the sperm and prevent it from fertilizing the egg. The idea is to create a form of biological control to help prevent the spread of mosquito borne diseases such as West Nile encephalitis. You can read a summary of the study here or have a look at the full research here.

KNOW YOUR MOSQUITO

Culiseta tonnoiri (no common name)

- *Culiseta tonnoiri* is an endemic species to New Zealand
- This species is found in Northland and Auckland in the North Island, as well as Westland and Southland in the South Island
- The preferred habitat is in areas with high rainfall and high humidity, and eggs are laid in slow-moving stream margins, pools or backwaters, and shaded groundwater ponds. This species prefer water that is rich in decaying organic matter
  - It is often found in valleys with kauri, beech or podocarp forest
- Is the principal carrier of Whataroa virus which is an avian arbovirus that is endemic to New Zealand (this virus does not affect humans, and has very little effect in birds)
- *Culiseta tonnoiri* can be a pest species when present in large numbers as it will bite a large range of hosts including humans
  - Peak biting is in summer and autumn and primarily occurs after sunset, with some occurring in shaded areas during the day
- Both adults and larvae of *Culiseta tonnoiri* look very similar to the other endemic *Culiseta* species, *Culiseta novaezealandiae*, with scales on the wing in adults or anal gills of the larvae being used to distinguish the two species, along with the location of collection

MOSQUITO CROSSWORD

ACROSS →

1. A GAT attracts ___ female *Aedes* (6).
2. *Aedes notoscriptus* and *Culex sitiens* have a banded ___ (9).
3. *Culex* ___ was the dominant larval species in February (16) .
4. *Aedes aegypti* common name is the ____ ____ mosquito (6,5).
5. A vaccine-preventable vector-borne disease that also affects pigs (8,12).
6. This bacteria is capable to reduce the mosquitoes' ability to transmit viruses (9).
7. An attractant used with BG traps (2,4).
8. What is the world's deadliest animal? (8).
9. A tool that can be used to collect mosquito larvae from bromeliads (6,6).

DOWN ↓

1. This virus can cause microcephaly in unborn babies (4).
2. Life stage in which mosquitoes do not feed (4).
3. Males mosquitoes emerge first and stay close to the ____ ____ waiting for females (8,4).
4. CO2-Baited Light Trap is the recommended option to capture ___ mosquitoes (9).
5. A mosquito-borne disease caused by a Protozoan parasite (7).
6. This insect can transmit the plague (4) .
7. Sleeping under a ___ will protect you from being bitten by nocturnal mosquitoes (3).
8. *Culex* eggs stick together to form a ____ (4).

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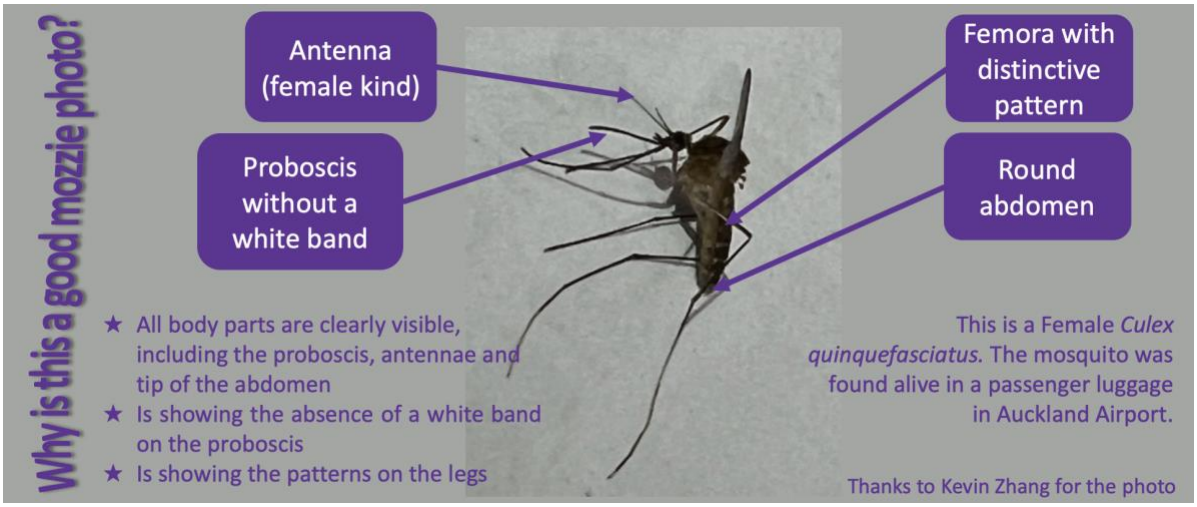
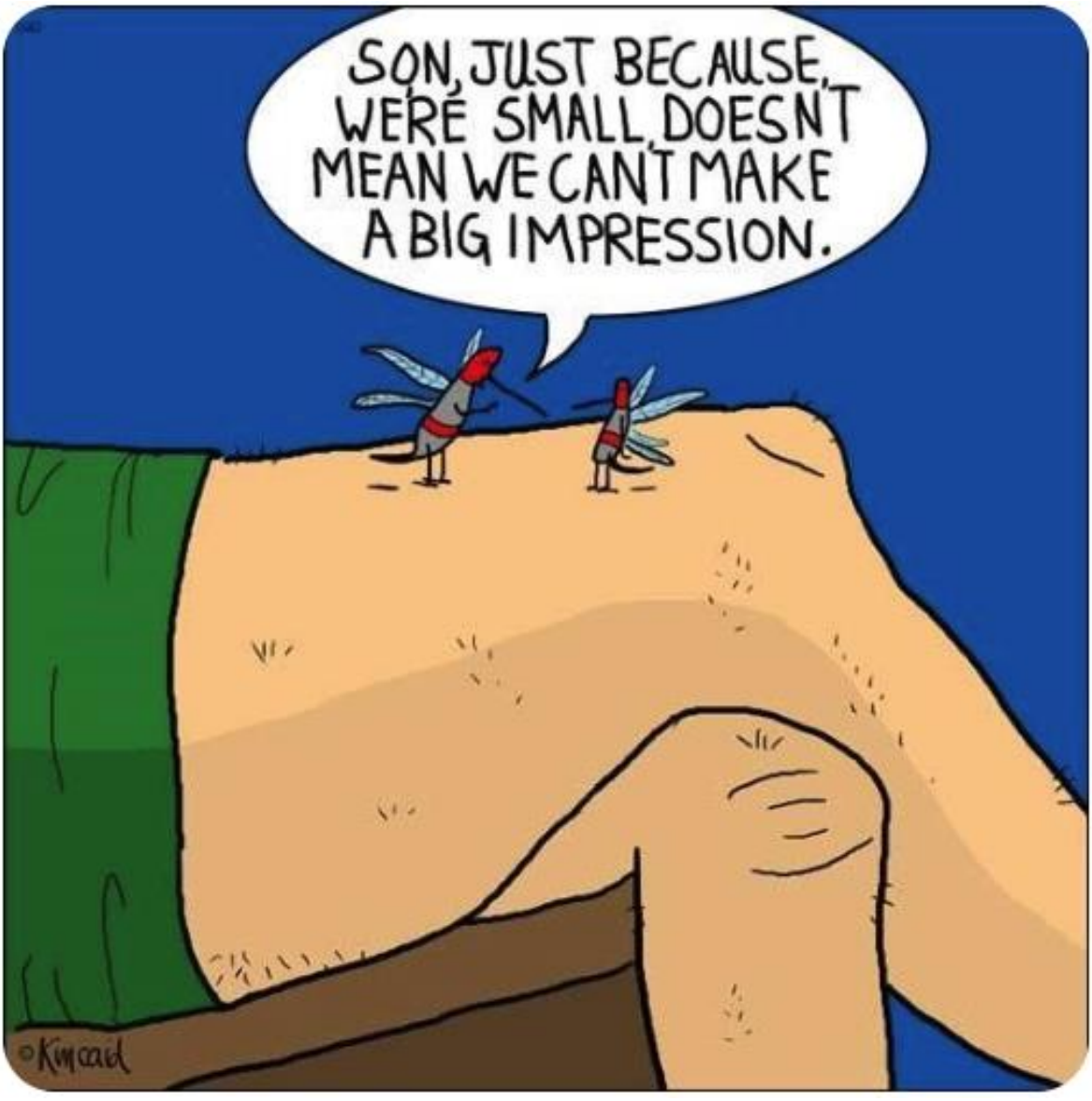
BEST MOZZIE PHOTO OF THE MONTH



A BITE OF HUMOUR



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RISK MAPS

Dengue Map – Centres for Disease Control and Prevention
Zika Map – Centres for Disease Control and Prevention
Malaria – Centres for Disease Control and Prevention
Malaria – World Health Organisation

DISEASE OUTBREAKS

To find out where the latest disease outbreaks have occurred visit:

Epidemic and emerging disease alerts in the Pacific region - Produced by the Pacific Community (SPC) for the Pacific Public Health Surveillance Network (PPHSN).

Disease Outbreak News - World Health Organization.

Public Health Surveillance - Institute of Environmental Science and Research (ESR) - Information for New Zealand Public Health Action.

Communicable disease threats report - European Centre for Disease Prevention and Control